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November 10, 1951

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

TECHNOLOGY DEPT.

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SURGERY

Trade New Hearts for Old

Operation transplanting heart from one dog to another successful. Cross-circulation procedure may eliminate mechanical pumps during heart operations.

► **SUCCESS WITH** an operation to transplant a heart from one body to another was reported at the meeting of the American College of Surgeons in San Francisco.

The operation was performed in a series of dogs by Drs. Emanuel Marcus, Aldo A. Luisada and Samuel N. T. Wong of the Chicago Medical School.

In some cases both heart and lungs were transplanted, while in others the heart was transplanted without the lungs. Electrocardiograms, X-ray pictures and other tests showed that two distinctly different hearts were beating and pumping blood in the animal's body.

Progress with another method of getting away from mechanical pumps during heart operations was reported by a seven-man research team from the University of California School of Medicine. The method consists essentially of a cross-transfusion or cross-circulation procedure in which the

heart and lungs of one animal or person are made to pump and oxygenate the blood for another.

Successful complete cross circulation in man has been effected in seven instances. Now the scientists have reported using the method on dogs whose hearts were opened as would be necessary in certain types of operations to repair damaged or defective hearts, for example in the case of "blue babies."

Mechanical pumps, for keeping blood flowing during such operations, they point out, have the disadvantages of increasing the tendency to blood clotting and destroying some of the cells in the blood. The California scientists reporting are: Drs. Edwin Kerr, Cooper Davis, John Woolsey, Jr., Orville Grimes, H. Brodie Stephens, Ralph Byron, Jr., and H. J. McCorkle.

Science News Letter, November 10, 1951

GENERAL SCIENCE

Expanded Draft Asked

► **CONGRESS WILL** be asked shortly after the first of the year to authorize drafting of veterans or fathers, or to draft those presently eligible for three years instead of two. This is to provide for a 4,000,000 man armed force. College, agricultural and industrial deferments may also be tightened.

Presidential advisers and Defense Department manpower experts are now working on the problem of how to squeeze a permanent 4,000,000 man armed force out of our population. Congress set a top limit of 5,000,000, but appropriated for only 3,600,000. Already the armed forces have gone above that figure.

With 1,050,000 men becoming 18½ each year and not all of those draftable, and with a "career" force of about 1,000,000 who will keep on re-enlisting, it is certain that changes will have to be made even to keep up a 3,600,000 man armed force.

One new source of men will become available next June, college graduation time. Men who have completed their studies under the college deferment plan will find themselves in the armed forces. In addition, those who have been permitted to complete their college year, even though they did not pass the college deferment test, will find themselves draft liable.

Defense Department officials do not consider men deferred for college a loss because the number deferred to become freshmen are replaced by those who graduate and thus lose deferment.

To bring the armed forces up to 4,000,000 in the next few years, the National Guard and reserves not already in service will be called up. In addition, the pool of men between 19 and 26, which includes fathers and veterans, will be utilized, if Congress approves.

However, that pool will be drained in a few years. Fortunately, the number of men becoming 18½ years old each year will go up in a few years—sharply by 1956. Nevertheless, it is expected that 18½-year-olds will have to serve a minimum of three years if we are to have an armed force the size the experts think necessary.

Enactment of Universal Military Training, proposed recently by the National Security Training Commission, is a long way off. Almost all the young men who would be trained under UMT for six months are already eligible to be drafted for two years.

Others are deferred until they finish their college educations, when they are liable for similar service.

The National Security Training Commission asked for six months UMT for every qualified 18-year-old plus an active

reserve program as soon as the international situation permits. The program would be civilian-controlled, separate from training of regular recruits. It would combine military training and enough technical training to give UMT'ers background for study on a reserve basis.

For long-range defense of the nation, the commission declared, this would provide adequate forces in readiness, if other aspects of our defense were not neglected.

Science News Letter, November 10, 1951

NATURAL RESOURCES

AEC Expects New Finds of Uranium in Latin America

► **DISCOVERY OF** uranium, the atomic bomb element, in some of the other American Republics in Central and South America is likely when relatively unexplored areas are prospected for this metal.

This was indicated in a U. S. Atomic Energy Commission statement prepared for delivery before the American Institute of Mining and Metallurgical Engineers meeting at Mexico City.

Uranium production in the United States has increased greatly as the result of a three-year AEC program, it was indicated. There are probably more individual prospectors looking for uranium than for any other metal. Large mining companies are making substantial investments in mines and plants. Many small operators are mining ore. Hundreds of thousands of feet of exploratory drilling are sunk each year. There are also airborne radiometric surveys.

Exploration and development in Canada has been equally successful, and South Africa, Australia and a number of other countries soon will be on the list of important uranium producers.

Science News Letter, November 10, 1951

RADIO

Radio Beams Give Octuple Communication

► **TELEPHONE AND** telegraph messages may be sent eight at a time to towns and cities off the main line of radio beam communications with a new system developed by Western Union engineers.

The system was described by E. M. Mortenson and C. B. Young at the American Institute of Electrical Engineers meeting in Cleveland.

Simple micro-wave equipment made up of components already commercially available are used. The system is designed to send and receive over a line-of-sight path of 20 miles. It provides a high-quality 100-kilocycle information band which is subdivided into eight 3000-cycle voice bands suitable for carrier telegraph, telephone or facsimile operation.

Science News Letter, November 10, 1951

BACTERIOLOGY

Germ Warfare Set-Up

Still partly hush-hush set-up for defense against BW outlined. "Twelve outstanding investigators in various parts of country" will work on problem.

► FIRST NEWS of a relatively new and still partly hush-hush set-up for defense against BW, or germ warfare, was given by Dr. Dorland J. Davis, of the National Microbiological Institute, U. S. Public Health Service, at the meeting of the American Public Health Association in San Francisco.

The new set-up has the title, Sectional Research Program in Microbiology. For this program, "12 outstanding investigators in various parts of the country" have been asked to work with other scientists in their vicinity and with five to 10 laboratories in nearby universities, state health departments, hospitals or research institutions.

Names and locations of the 12 scientists were not given by Dr. Dorland because they are still classified as secret by civil defense authorities.

The 12 scientists and collaborating laboratories are expected to speed research, some of it already going on, which will strengthen our defenses against BW. Specifically, it is hoped that through this pro-

gram there will be developed better, faster tests for identifying disease agents; simpler methods for detecting antibodies in the blood to such agents; methods for vaccinating against the disease agents after a person or population has been exposed to them; methods for treatment after such exposure; treatments for virus diseases for which no treatment now exists; better general immunizations, or vaccinations, with more effective and lasting effects; and better methods of investigating epidemics.

The laboratories in this new BW defense program will not be asked to do routine diagnostic work nor take part in regular public health work. Only in unusual circumstances, presumably such as a suspected BW attack, will they be called on by official agencies for expert aid.

Financial support for the research under this program will be given through the regular U. S. Public Health Service mechanism of grants-in-aid, given to applicants upon approval of the National Advisory Health Councils.

Although national defense is the primary concern behind establishment of this program, results from it are expected to benefit national health in general, Dr. Davis pointed out.

Science News Letter, November 10, 1951

PUBLIC HEALTH

Method Predicts Polio Epidemic and Cases

► A METHOD of predicting the total number of cases of infantile paralysis to be expected within a given year and of forecasting when an epidemic is brewing was reported by Dr. F. M. Hemphill of the University of Michigan School of Public Health at the meeting of the American Public Health Association in San Francisco.

Dr. Hemphill in the middle of last July predicted that the total number of polio cases for the year 1951 would be 27,000. The total number of cases reported to the U. S. Public Health Service from the first of the year through Oct. 20 was 23,853 and federal health authorities that week stated some 30,000 cases may be the total for the calendar year.

In his report Dr. Hemphill did not give any evaluation of the results of his methods but only the technical statistical procedures.

Science News Letter, November 10, 1951

ANTHROPOLOGY

Government Officials Lean and Unmuscular

► A DEFINITE relationship between the build of men and what they do is reported by two Harvard anthropologists, Frederick Stagg and Prof. Earnest A. Hooton.

Studying careers and body-measurements of 2,631 Harvard graduates before World War I, they have made such observations as:

Government officials in the group are usually lean and unmuscular.

Scientists tend to be moderately thin with a better than average supply of muscles.

Theology attracted the lean, unmuscular, lightly built men, but there was a significant minority of the muscular, "fighting parson" type.

Solidly built, muscular men of European ancestry usually came from southern, not northern, Europe.

Men whose forebears traced back to the time of the American colonies were apt to be more muscular than those with British or British-American parents.

Because a Harvard physical director compiled body-measurement photographs of men of Harvard classes of 1876 to 1912, the material existed that allowed the study.

A similar confidential study of 45,000 World War II soldiers demonstrated to Mr. Stagg that men of certain body types are best fitted to particular jobs.

Science News Letter, November 10, 1951



BETTER PLANTS—In the hands of the scientists, the flower of a tomato plant, the vial containing a plant hormone solution and the glass applicator are necessary tools to bring us better food through research.

RADIO-ASTRONOMY

Meteors "Flash" to Radar

► "SHOOTING STARS" flash into view for all observers at about the same instant and disappear as suddenly for all. But radio experts observing radar screen "pips" caused by reflections from the ionized path of these visitors from space find that the meteor signals last longer when they tune in at a lower frequency.

Throughout an entire year V. C. Pineo and T. N. Gautier of the Central Radio Propagation Laboratory of the National Bureau of Standards clocked meteors at the NBS radio field station at Sterling, Va., about 30 miles west of Washington. Meteors lasted about twice as long when picked up at 27.2 megacycles as when their "pips" were captured at 41 megacycles, they report in *SCIENCE* (Nov. 2).

Their studies confirm an earlier report by Dr. A. C. B. Lovell, director of radar research on meteors at England's University

of Manchester. Dr. Lovell concluded that the duration of a meteor on a radar screen is roughly inversely proportional to the square of the frequency used to pick it up.

Research such as this helps scientists understand what is happening in the upper atmosphere. It enables them to check different theories about how atoms in the upper air are stripped of their electrons as the "shooting stars" race by, and how they are reunited.

Recombination of the atoms does not play as important a part in the echo as their diffusion, Mr. Gautier concludes. Recombination is rapid at first, then takes place much more slowly. In the meantime the ionized atoms are spreading out, and having less and less effect on the radar screen. This combination of effects is reflected in the varying times at which the "pips" can be picked up at different frequencies.

Science News Letter, November 10, 1951

of six groups of citizens. Each group will be chosen to represent a particular social and economic status in areas of varying degrees of intensity of air pollution. The plan now is to include about 5,000 family units, 500 of them in Windsor and the rest in Detroit. Assuming four persons to the average family, this will give information on about 20,000 persons.

Meteorological conditions in the area will receive special attention throughout the investigation.

Science News Letter, November 10, 1951

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PUBLIC HEALTH

International Air Tackled

► FOR THE first time, so far as is known, the technical and scientific resources of two nations are being combined to determine the effects of air pollution on the health of populations. J. R. Menzies, chief of the public health engineering division of the Canadian Department of National Health and Welfare, declared at the meeting of the American Public Health Association in San Francisco.

Pollution of the air in the Detroit, Mich.-Windsor, Ont., area is the project now getting this international scientific and technical study. Smoke, soot and fly ash from the 30,000 or so passages of vessels each year on

the Detroit River pollute the air of the region. In addition to the river traffic fuel consumption, about 16 million tons of coal are burned annually in the highly industrialized Detroit-Windsor area, besides other fuels such as gas and oil.

The International Joint Commission on Air Pollution has since 1949 had studies under way to determine the extent of air pollution in various parts of the Detroit-Windsor area.

When enough information is available from these studies, the Commission will gather information on the health, particularly on diseases of nose, throat and lungs,

Question Box

ASTRONOMY

How many solar eclipses may yet be seen this century? p. 296.

DENTISTRY

What is the cost of life-time tooth protection by fluoridation? p. 297.

ENTOMOLOGY

Why does the "praying" mantis pray? p. 302.

INVENTION

How can underwater oil now be detected? p. 295.

Photographs: Cover and p. 298, Elwood M. Payne; p. 291, U. S. Department of Agriculture; p. 293, Reuben Goldberg; p. 295, Westinghouse Electric Corporation.

NATURAL RESOURCES

Where may new finds of uranium be expected? p. 290.

From what source may come some of our future supply of sulfur? p. 298.

PHYSICS

What are the heaviest elements so far found in cosmic rays? p. 294.

PHYSIOLOGY

What are some ways of relieving painful feet? p. 296.

SURGERY

How can short legs be made to grow? p. 303.

ARCHAEOLOGY

Trace Eskimo Ancestors

Ancestry of American Eskimo can be traced back to Middle or Old Stone Age Man of Europe, recent material never before found in New World shows.

► **ANCESTRY OF** the American Eskimo can be traced back to Middle or Old Stone Age Man of Europe, Dr. Henry B. Collins, anthropologist of the Bureau of Ethnology, suggests in the annual report of the Smithsonian Institution.

Not that the caveman made the crossing to the New World. Instead, Dr. Collins theorizes, small groups of hunters and fishers moved north during the Middle Stone Age to the taiga and tundra zones of central and northern Siberia where they perpetuated a Stone Age way of life long after it was abandoned in more favorably situated Europe and Asia.

Descendants of these people crossed to America at Bering Strait. At a later time they moved eastward along the Arctic shores of Alaska, Canada and Greenland.

Dr. Collins' theory is based on evidence unearthed in recent years in Siberia and the American Arctic.

The oldest cultural remains found in the Bering Sea region were discovered on Cape Denbigh, Norton Sound, by Dr. J. L. Giddings, Jr., in diggings made from 1948 to 1951.

Among the remains found beneath several layers of more recent material were burins, never before found in the New World. These are stone implements characteristic of the work of Middle and Old Stone Age man. They are distinguished by a stout edge for cutting deep grooves in bone and similar material. In addition there were blades typical of the work of Folsom and Yuma Man of southwestern United States; lamellar flakes, probably used as tiny knives or scrapers, which link these people with Stone Age inhabitants of Asia; and small, finely-chipped side blades indicating that the Cape Denbigh people used slotted bone points with inset blades along the sides, characteristic of Siberian and European Stone Age man.

Among the remains of an ancient Dorest culture found by Dr. Collins and others on Baffin Island, and other parts of the Canadian Arctic, discovery was made of lamellar flakes of the same kind as those found at Cape Denbigh. Also found was an implement which was apparently a development of the old Stone Age burin, pointing to the fact that these far northern Ameri-

cans may have been descendants of the original immigrants to Cape Denbigh, those who migrated eastward and north.

Science News Letter, November 10, 1951

RADIO

Longer Radio Relays by Short Waves Past Horizon

► **RADIO RELAYS** in the future over hundreds of miles by microwaves and very high frequencies are considered possible by Dr. Thomas J. Carroll of the National Bureau of Standards.

To the American Physical Society meeting in Chicago he reported that revised theory explains how the short waves are heard far beyond the horizon formerly believed to be their limit.

As higher powers of radio transmissions of broadcasts and radar were used, there were increasingly frequent reports of receptions far beyond the "line of sight" beyond which the signals should not have gone as a result of the high attenuation of the supposed refracting atmosphere. The experts began to realize that the reports of distant reception were not freak accidents, but justified by revised theory that discarded the assumption of linearly decreasing index of refraction to indefinitely great heights of the upper atmosphere.

Ten centimeter waves have been received at about 360 miles and some of the bands that had previously been turned over to amateurs as virtually useless for communication are proving of potential communication and military value.

Future experiments may prove, Dr. Carroll suggested, that relays much longer than the 30 miles now practical may be made. How long the distances will be must depend upon the results of further tests. How wide the bands can be and whether they will be useful for a couple of voice channels and even TV is still to be determined.

Science News Letter, November 10, 1951

MEDICINE

Second Polio Attack Possible but Infrequent

► **A SECOND** attack of infantile paralysis is possible but rarely happens, Dr. David Bodian of the Johns Hopkins University, Baltimore, declares in a report to the National Foundation for Infantile Paralysis in New York.

The reason for the occasional second attacks is the existence of three kinds or strains of the virus that causes the disease. An attack by one of the viruses gives immunity to further attacks by that virus. It may give partial immunity to attack by the other two viruses. But it may not give enough immunity to protect against attack by one of the other viruses.

Science News Letter, November 10, 1951



LINK TO STONE AGE—The small blades (top left), unearthed at the Denbigh site by Dr. J. L. Giddings, Jr., link these people with Stone Age inhabitants of Asia. The paper clip shows the tiny size of the lamellar flakes.

GENERAL SCIENCE

Short Trained Personnel

► **SHORTAGE OF** scientists, technicians and engineers in this country is hampering this country's Point IV program and the United Nations' technical assistance program.

Point IV hopes to hire between 400 and 600 specialists of all kinds to go to 19 Latin American countries, the Arab states, Israel and, perhaps, the southeast Asian countries. UN, through UNESCO, expects to need about 30 men and women, in a higher category, before the next year is out.

Jobs range from the scientific advisory officer of the government of Ceylon to a position similar to that of an American country farm agent.

UNESCO needs such people as a woman expert in child psychology for Libya, a hydraulic and dam construction engineer for India, a chemical engineer for Chile.

Point IV hopes to recruit people who can teach illiterates to read, and then to brush their teeth. It also wants experts in soil con-

servation, forestry, land use, horticulture, water use, safety, child welfare and industrial education and lots of engineers.

UNESCO already has difficulty in recruiting Americans for this program. Point IV, which has not yet actively started recruiting, expects similar difficulties. Both point to the fact that most of their programs are centered in underdeveloped areas of the earth—places not suited to comfortable living. Both are aware of the increasingly critical shortage of this kind of specialized personnel in this country. However, both hope that, with diligent recruiting, they can get the proper kind of people to work for their programs.

By "proper kind of people" they mean men and women who combine scientific knowledge or technical skill with at least some of the attributes of the diplomat. They want people who can get along in the new cultural environments to which they will be sent.

Science News Letter, November 10, 1951

BIOCHEMISTRY

Blame for Baldness

► **MEN GET** bald because the male sex hormone stimulates oil-producing glands in the skin to change the amount or quality of the oil they produce.

This, briefly, is the new theory of the cause of baldness developed from research by Dr. Peter Flesch and associates at the University of Pennsylvania in Philadelphia.

The skin oil is technically termed sebum. When painted on the skin of rabbits and mice, all the rabbits and many of the mice lost their hair in 10 days.

Starting point for the sebum investigation was the fact that workers in plants making the synthetic rubber, neoprene, both in this country and in Europe, lost their hair temporarily without any other harmful symptoms. The rubber workers' hair loss was traced to six chemicals that are by-products in the manufacture of the rubber. Of the six, three are normally present in human sebum. These three are: 1. squalene, also found in liver oil of sharks and other fish; 2. oleic acid, a colorless fatty acid which is a constituent of most common fats and oils; and 3. linoleic acid, a fatty acid from linseed oil.

The same chemical grouping found in these depilatory agents also occurs in vitamin A. Physicians have found that excessive amounts of vitamin A taken over a long period lead to loss of hair in children. One adult case has also been reported. Dr. Flesch and associates found that vitamin A caused hair loss in their laboratory

animals when painted on the skin, just as sebum does.

Dr. Flesch and associates hope for three practical results from their findings: 1. new depilatories for those bothered with excessive or unwanted hair growth; 2. a way to check baldness in humans; and 3. more complete knowledge of skin diseases including skin cancer. But they point out that fulfillment of these hopes will not come before much more work has been done.

Science News Letter, November 10, 1951

PHYSICS

Heavy Cosmic Ray Particles Copper, Bromine, Tin Found

► **DISCOVERY THAT** hearts of atoms heavier than any previously observed are bombarding the earth from outer space was reported to the American Physical Society meeting in Chicago by Dr. Herman Yagoda of the National Institutes of Health, Bethesda, Md.

Cosmic ray particles consisting of the charged nuclei as massive as copper, bromine and even tin are contained in the stream of radiation arriving in the stratosphere. While most of the cosmic radiation consists of protons, which are hydrogen atomic nuclei of tremendous energies, teams of physicists from the University of Minnesota and the University of Rochester

about two years ago discovered they are accompanied by equally energetic heavy atoms of carbon, silicon, calcium and iron. Now Dr. Yagoda from new experiments with photographic emulsions carried to 110,000-foot elevations by giant plastic balloons has found even heavier atoms.

Emulsions about a hundred times thicker than on ordinary plates were used to capture the heavy atoms.

Science News Letter, November 10, 1951

ENTOMOLOGY

Predict Success in Fly Control if Sanitation Used

► **MAN IS** making progress in his battle against flies, and the "chances for future control are good," Dr. Ralph E. Heal, technical director of the National Pest Control Association, told that organization's annual meeting in Boston.

But we will have to give up our reliance on insecticides only for such control, he warned, and "return to sanitation as a major phase of fly control." This is because flies exposed to various insecticides build up a resistance to that chemical, and they pass this resistance on to their offspring. This resistance is not only to DDT but to some of the newer insecticides, such as methoxychlor, chlordane, lindane and diel-drin. The immunity to DDT can persist through many generations, as many as 30 or more, he said, about the equivalent of 10 years in New York City.

However, better sanitation and more skilled application of insecticides, plus such measures as screening, would give control over flies, Dr. Heal predicted.

Science News Letter, November 10, 1951

GENERAL SCIENCE

NSF Prepares to Spend Reduced Appropriation

► **THE CUT** in the National Science Foundation appropriation from the requested \$14,000,000 to the approved \$3,500,000 means reductions in the size of both the fellowship and the research programs, the NSF has declared.

About \$1,500,000 will be spent on basic research in biology, medicine, mathematics, the physical sciences and engineering. Proposals for research grants are now being evaluated. Dr. John Field heads the division of biological sciences and is acting head of the division of medical research, and Dr. Paul Klopsteg heads the division of mathematical, physical and engineering sciences.

For training scientific manpower, some \$1,350,000 will be spent. Balance of the money will go for development of a national scientific policy, for promotion of basic research and for other services.

Science News Letter, November 10, 1951

MEDICINE

Virus Atypical Pneumonia

Diagnosis of such a disease is "meaningless," two Liverpool doctors report. Believe disease is "segmental aspiration pneumonia."

► THE NAME and diagnosis "primary atypical pneumonia," or virus pneumonia, which countless patients in recent years have been told they had, is attacked as "meaningless" and "not a specific condition" in a report by two Liverpool physicians to the British Medical Journal (Oct. 27).

The physicians are Dr. Philip W. Robertson, who is squadron leader and medical specialist of the R.A.F., as well as clinical assistant at the Royal Infirmary in Liverpool, and Dr. K. D. Forgan Morle, consultant radiologist to the Liverpool Regional Hospital Board and research assistant in the department of radiology, University of Liverpool.

These doctors believe that the condition many physicians have diagnosed as primary atypical pneumonia is "segmental aspiration pneumonia." It is caused, they believe, by aspiration, or breathing, into the lungs of mucus and pus from the nose and throat during colds and similar infections of the

upper breathing tract. These secretions, they believe, cause trouble in segments or subsegments of the lungs and bronchi, so they use the word "segmental" in the new name they propose for the condition.

This kind of pneumonia, they point out, got the name "virus pneumonia" because no germ of bacillus size could be identified as its cause, yet it seemed to be an infection, or germ-caused ailment. So doctors decided it was due to an unidentified small sized virus. Since the virus has never been found, the Liverpool doctors think it wrong to attribute the illness to a virus.

Comparison of symptoms and physical findings, including X-ray pictures in reported cases of primary atypical or virus pneumonia and in over 500 cases the Liverpool doctors call segmental aspiration pneumonia, shows "no significant difference between them."

Further evidence for their view that the disease is mechanically caused by aspiration of material into the lungs, rather than by

a virus, is, they believe, the fact that modern germ-fighting drugs, from sulfa drugs to chloromycetin and aureomycin, sometimes help and sometimes do not help the patient. These drugs could only help if there were a germ or virus present which was sensitive to the drug's action. In some cases such germs may be present as a complication of the original condition, and then the drugs might help.

Science News Letter, November 10, 1951

PUBLIC HEALTH

Freeze Dry Factory Wastes To Stop River Pollution

► FREEZE DRYING methods which now give us vitamin-C-rich fruit juices for breakfast and blood plasma stockpiles for treatment of shock in injuries, may provide the "real solution" to pollution of lakes and streams with factory wastes, now a serious problem.

Experiments are now under way to produce equipment which will do this job effectively and economically, George D. Armerding, of Mojonner Bros Co., Oakland, Calif., reported at the meeting of the American Public Health Association in San Francisco.

Low temperature evaporation equipment, he said, is also used in production of insulin for diabetics and of antibiotics, such as penicillin, for fighting germ diseases. Reduction in the cost of these medicines and production in sufficient volume to meet medical demands has been made possible through use of low temperature equipment.

Science News Letter, November 10, 1951

INVENTION

Device Helps Geologists Detect Underwater Oil

► GEOLOGISTS LOOKING for oil sometimes set off a small explosion on or just under the surface of the earth. The waves echoed back from deep inside the ground sometimes tell them whether rock formations below are likely to contain oil.

In looking for oil under the ocean, geologists have been dragging seismic devices, which record the echoed waves, along the bottom of the ocean behind a boat. In this process, cables were fouled, the recording device received a knocking about, and the work was generally hampered.

Now Roy Lee Gallaway, Laurel, Miss., has invented a method for keeping the recording devices suspended above the bottom as they are dragged along by the moving boat. He has assigned his patent 2,572,255 to the Texas Company, New York. He uses a semi-floating cable system which not only does away with the disadvantages of dragging the devices along the bottom, but also permits use of multiple detectors as is done on dry land.

Science News Letter, November 3, 1951



PYLONS, NOT WARSHIPS—These devices, known as pylons, are part of the underbelly of F-84 Thunderjets, suspended beneath each wing. They carry auxiliary fuel tanks or armament such as bombs, rockets or napalm tanks and have an electrical or air control system that permits jettisoning such equipment or, if needed, the pylon itself.

ASTRONOMY

**109 More Solar Eclipses
May Be Seen This Century**

► IF YOU missed seeing the two eclipses of the sun which took place this year, you will undoubtedly have another chance. There will be 109 more solar eclipses before the year 2000, reports Gordon Grant of Goodsell Observatory, Carleton College, Northfield, Minn.

Within the next 48 years, 35 total eclipses of the sun will be visible somewhere in the world, Mr. Grant states. Two annular eclipses have already occurred this year, and there are 32 more scheduled where the moon swings so far from the earth it appears to be smaller than the sun and thus does not completely cover it.

Three solar eclipses this century will be part total, part annular, for only part of the earth along their path will be near enough to the moon for the sun to be entirely hidden. In addition, there will be 39 partial eclipses of the sun, when the moon is a bit off-center as it passes between us and the sun.

The central path of few of these solar eclipses, however, will be visible from the United States.

The moon has not really been eclipsed this year, but there will be 72 lunar eclipses before the year 2000 rolls around. The moon will go entirely within the earth's dark shadow during 43 of these eclipses, but it will be only partially within for 29 of them.

In all, 181 more eclipses, most of them solar, are scheduled before the end of this century, Mr. Grant points out in *POPULAR ASTRONOMY* (Oct.).

Science News Letter, November 10, 1951

NUTRITION

**Square Meal for Lunch
Either at Home or School**

► WHETHER JUNIOR and Sister come home for lunch or eat it at school, they need a square meal to nourish their active growing bodies and minds. The meal is square if it furnishes plenty of protein for growth and repair of the body, plenty of calories for the active school age, important minerals like iron and calcium, and the essential vitamins.

One way of insuring a square noontime meal, whether prepared at home or at school, is to follow the Type A lunch of the National School Lunch Program. This calls for:

1. One-half pint of whole milk as a beverage.
2. Two ounces of lean meat, poultry, fish or cheese, or one egg, or a half cup of cooked dry beans or peas, or four tablespoons of peanut butter.
3. Three-fourths cup of vegetables or fruit or both.

4. One or more portions of bread or muffins—or other bread of whole-grain cereal or enriched flour.

5. Two tablespoons of butter or fortified margarine.

The lunch can be served hot or cold according to the season and other circumstances. A hot lunch may taste better on a cold day, and the cold lunch may be more appetizing on the warm days of Indian summer. But the meal can be nourishing regardless of its temperature.

The phrase, "hot school lunch," dates back to 30 years ago when the food needs of growing children were not too widely known. Many people then got the mistaken idea that if the school lunch was hot, it was all right. The nourishing value was either not known or not given enough attention.

The famous Oslo breakfast which has done so much for the health of Scandinavian school children was a cold meal. But it included ample milk, cheese, bread and other sturdy foods.

Science News Letter, November 10, 1951

MEDICINE

**Report Ways to Relieve
Feet That Are Painful**

► IF YOUR job calls for long hours of standing, you may be troubled by painful feet. Reason for it is the continuous strain on the arches, according to the Illinois State Medical Society. The pain results from the rigidity of the tissues and the spasm the muscles go into in their effort to overcome the strain.

One way to relieve the condition is to rest in bed, but this obviously is not practical for most persons. Another way is to have the shoes properly padded to change the strains and relieve them. This is best done under the supervision of a specialist who knows the anatomy of the foot and where strain comes from standing.

Some people have a painful foot condition known as "spurs." Lumps that look like small callouses are seen on the bone of the heel. This condition is often relieved by alternating each day a pair of shoes with different heel heights, thus removing the constant irritation caused by a rubbing shoe.

Pain in the feet at night often comes from disturbance of blood circulation. A contrast bath is advised to relieve this kind of pain. Use two pails, each big enough to put both feet in. Put hot water in one, cold water in the other. Place both feet in warm water for one minute, then in cold water for one minute. Keep up this alternating from hot to cold for 10 minutes. Massage and exercise also help.

Other causes of foot pains are shoes and stockings that do not fit properly and, in older people especially, arthritis.

If your feet bother you, you should see a doctor to learn the cause. Then proper treatment can be prescribed.

Science News Letter, November 10, 1951

IN SCIENCE

METEOROLOGY

**Cold November Predicted
For Two-Thirds of Nation**

► THAT SUDDEN cold spell which hit the eastern part of the nation the first week of November was only a taste of more to come.

"Recurrent surges of cold air from Canada" are expected during the month of November to drive temperatures over most of the eastern two-thirds of the nation down below what is usually expected. This is the prediction of the Extended Forecast Section of the U. S. Weather Bureau for the rest of November.

The coastal areas along the Gulf of Mexico and the Atlantic will escape this colder than normal weather. There, temperatures are expected to be more like what usually occurs in November.

Greatest departures from normal—in a downward direction—are expected in the central plains and Great Lakes regions.

Rain and snow will follow the weather. They will exceed seasonal normals during November east of the Mississippi.

West of the Continental divide, November will be slightly warmer than usual. The Pacific Northwest and the northern plains areas can expect more rain and snow than normal for November. In the Southwest, subnormal or normal amounts of precipitation are predicted.

Science News Letter, November 10, 1951

INVENTION

**Metal Sheets Perforated and
Expanded in One Operation**

► METAL SHEETS are expanded in length and drawn out into perforated sheets with diamond-shaped openings in a single operation by means of a machine into which the solid sheeting is fed at one end to come out at the other as slitted sheet or expanded metal. It can be used with other flexible materials.

In the machine a series of short cuts is made in the material along a line across it. Then another series of cuts is made a short distance from the first but with the centers of these cuts opposite the non-cut sections of the first line. Other alternating cuts follow in order.

The output end of the machine has rollers that rotate faster than the intake so that the cut material comes out in a stretched or expanded form. Inventor is Adam Ziska, Wauwatosa, Wis. Patent 2,565,641 was issued to him. Rights have been assigned to Research Products Corporation, Madison, Wis.

Science News Letter, November 10, 1951

ENE FIELDS

DENTISTRY

Lifetime Tooth Protection For \$2.10 Via Fluoridation

► FOR A couple of bucks a baby today can have lifetime protection of his teeth against decay. In round numbers, that is what it costs per person if the community fluoridates its water supply. More specific figures were given by Dr. Herman E. Hilleboe, Commissioner of Health for New York State, as follows:

Cost of fluoridation per person is five to 15 cents annually, depending on the amount of natural fluorine in the community water supply. Fluoridation, trials in some communities over the past several years show, will reduce the amount of tooth decay expected by about two-thirds. If a person lives to be 70 years old, which is about what children born this year can expect, he will receive for the total cost of \$2.10 an expected reduction of 67% in tooth decay.

Fluoridated water is water to which a small amount of a fluorine salt is added. There is no danger to health from this water if treatment is properly done. Children drinking this water from birth get enough of the fluorine to protect their teeth from decay to a large extent. Even older children get some benefit from such water. More and more communities are fluoridating their water supply.

"If this trend should continue," Dr. Hilleboe predicted, "we may reach a point where with the present complement of practicing dentists we may be able to treat such caries as may occur and reduce tooth mortality and untreated caries to a negligible level."

Dr. Hilleboe reported at the American Public Health Association meeting in San Francisco.

Science News Letter, November 10, 1951

TECHNOLOGY

Steel Shortage Partly Met By 11 New, Huge Furnaces

► ELEVEN HUGE new open hearth steel-making furnaces now in operation in Pittsburgh, capable of an output of 2,000,000 tons annually of steel ingot, will go far in relieving the present steel shortage due to emergency world conditions. The first heat of steel was tapped on Oct. 30 in public ceremonies dedicating the new plant.

This plant was built and will be operated by Jones and Laughlin Steel Corporation, the nation's fourth largest steel producer, and will increase the company's annual production of steel ingots from

close to 5,000,000 tons a year to 7,000,000 tons annually. Construction was started in May 1950 and was pushed to completion in record time because of the steel emergency. The tapping marks the first major increase in the country's ingot production since the Korean emergency.

Open hearth furnaces are the greatest steel producers of all time. During 1950, over 85% of the steel ingot production in the United States was from open hearths. The first basic open hearth furnace in this country was built in 1880. Since that time great strides have been made in developing more efficient and larger open hearth furnaces.

These new furnaces will go far in helping the American steel industry meet its own objective of producing this year 118,000,000 tons of steel. On Jan. 1, 1951, total steelmaking capacity stood at a little over 104,000,000 tons. Steel companies are currently engaged in the greatest two-year period of expansion in history.

Science News Letter, November 10, 1951

PUBLIC HEALTH

Preventing Disabilities Of Nation's Athletes

► A FOUR-POINT program for preventing many of the disabilities that are the hazards of an athletic career in school and among professional athletes was presented at the American Congress of Physical Medicine.

The recommendations in the program were drawn up by a team physician, an active athlete with a background of physical education and a physiatrist. They are Dr. Norman C. Ochsenhirt, professor of maxillo-facial surgery and anatomy at the University of Pittsburgh and chairman of the University of Pittsburgh Athletic Committee; Clifford D. Chambers, member of the pitching staff of the St. Louis National League baseball club; and Dr. Murray B. Ferderber, professor of medicine at the University of Pittsburgh School of Medicine.

Their recommendations follow:

"(1) We believe sound physical, emotional and vocational evaluation in the high schools, colleges, and professional ranks would facilitate selection. We admit that fewer athletes might be chosen, but contend that those unfitted for sports would thus be spared and our ratio of disabilities would be materially lessened.

"(2) We believe that athletes should be examined at the beginning and end of each season to discover any physical changes which might have arisen.

"(3) We believe that a complete lay-off at the end of any athletic season should be available, being equivalent to a vacation.

"(4) We believe that mimeographed, illustrated copies of exercises should be sent to players about a month before a 'season' begins."

Science News Letter, November 10, 1951

MEDICINE

Cortisone Restores Sight Lost in Mystery Disease

► A YOUNG woman who was "almost blind" and had to be led into the hospital regained 76% of normal vision after treatment with cortisone, famous anti-arthritis hormone remedy, Drs. Louis E. Siltzbach, Adolph Posner and Myer M. Medine of Montefiore Hospital, New York, report in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Nov. 3).

The patient was losing her eyesight and also had lost 20 pounds and grown quite weak during a six-month period because she was suffering from a disease known as sarcoidosis. This is a chronic ailment affecting lymph nodes, lungs, bones, intestines, spleen, liver and skin separately or in various combinations. No cause for the disease is known and so far no specific treatment has been known.

Early this year Dr. Maurice Sones and associates of Philadelphia reported improvement in two sarcoidosis patients after cortisone treatment. Improvement in six more patients, besides the woman who was going blind, is reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Nov. 3) by three other doctors. They are: Drs. Francis J. Lovelock and Daniel J. Stone of the Bronx Veterans Administration Hospital, New York, and Dr. Maurice J. Small of Halloran Veterans Administration Hospital, Staten Island, N. Y.

Sarcoidosis is believed by some authorities to be a form of tuberculosis. Since cortisone is bad medicine for TB, Dr. Small warns that it should be used carefully in patients with sarcoidosis.

Science News Letter, November 10, 1951

ENGINEERING

Warning Device for Buses Forestalls Brake Failures

► THERE WILL be less danger of accidents involving city buses with a new electrical device which gives warning of the loss of oil in their hydraulic systems and consequent brake failure and loss of steering power.

This alarm system has been thoroughly tested on buses in Miami, Fla., and in New York City. It is a product of the Bendix Aviation Corporation and was described to the American Institute of Electrical Engineers meeting in Cleveland by F. O. Wisman and W. E. Windsor of the Bendix company.

In the system, a sensory cartridge containing a thermistor is placed in the oil reservoir and connected in series with a battery and alarm lamp or buzzer. The thermistor is a device in which the electrical conductivity is radically influenced by temperature.

Science News Letter, November 10, 1951

NATURAL RESOURCES

Sulfur—Industrial Helper

The brimstone of the Bible plays an important part in modern agriculture and industry. Millions of tons used each year to produce essentials for war and peace.

By A. C. MONAHAN

See Front Cover

► SULFUR TO grandfather in his early boyhood days was a spring tonic taken with molasses to "thin the blood" after a long-winter diet without table greens. Or perhaps oldsters remember it best from the vile smell of old fashioned kitchen matches. Few then thought of it as an essential in industry.

Sulfur today plays a big part in the production of many important materials ranging from synthetic rubber to fertilizers for the farm.

Some is used as sulfur itself but far more in sulfur chemicals such as sulfuric acid. In fact so high is the demand that it is on the list of short supplies. Considerably over 4,000,000 tons are consumed each year by American industries and the total would be higher if more sulphur were available.

The United States has become the world's principal source of sulfur. America produces enough to meet all domestic needs if it was all used at home. But this nation has a clear duty to the nations of western Europe and other countries to help make them industrially efficient to meet any emergencies that may arise. For that reason it is shipping annually over a million tons to nations that have long relied upon the United States for this product.

Agriculture Biggest Consumer

Sulfur is used in many industries, but agriculture is the greatest consumer. Its most widespread application is in converting phosphate rocks to superphosphate fertilizer.

Other large consumers are the chemical industry, petroleum producers and refiners, paint and pigment makers, steel mills, paper makers, the textile industries and explosives manufacturers. In these industries some sulfur is consumed as sulfur itself but the greater part is used as sulfuric acid or some other sulfur compound.

America's principal supply of sulfur is in natural domes of the element itself discovered from 300 to 2,000 feet under the earth along the coast of the Gulf of Mexico. The discoveries were made in certain cases in drilling for petroleum. After the first dome of natural sulfur was found, years passed before a commercial method was developed to get it out of the low, wet land.

About 88% of the over 5,000,000 tons of sulfur now produced in the United States comes from the domes of native sulfur of the Louisiana-Texas coastal region. More than half the rest is obtained from sulfur-bearing minerals, which are plentiful and widespread but which require expensive chemical treatment before the sulfur is separated. Other sources of sulfur are smelter gases, refinery gases and sour natural gases.

How much sulfur there may be in natural deposits in the Gulf Coast area or elsewhere nobody knows. A new deposit found recently in southern Louisiana in the delta of the Mississippi will produce over 500,000 tons annually when equipment is installed. This will probably be late in 1953. Other new domes recently discovered are now in production or will be shortly.

The location of these natural sulfur deposits under marshes and swamps along the Gulf Coast makes mining by ordinary methods impossible. A relatively inexpensive and efficient method, the invention of an American chemist named Herman Frasch, is used. It requires no underground

miners. Hot water, forced down through a drill hole to the deposit, melts the sulfur and brings it to the surface.

The process is not quite as simple as that, however. Sulfur is twice as heavy as water and means must be provided to bring it to the surface. Air under pressure is used to do this.

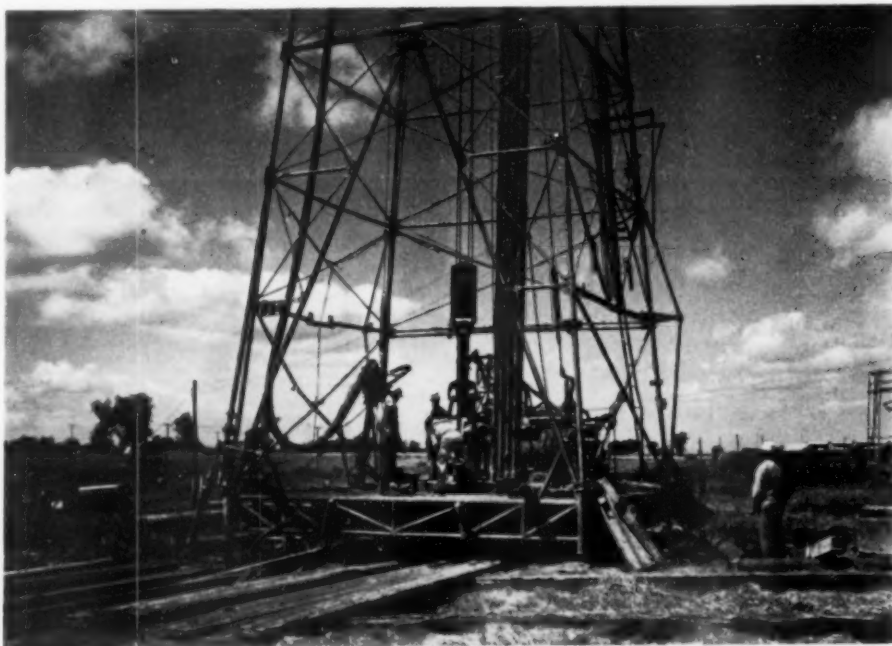
Piped to Surface

The eight- or ten-inch hole drilled down through the surface soil, underlying sand and layers of rock into the sulfur deposit, is fitted with a large pipe within which is a smaller pipe and within this still another of smaller diameter. In other words, the hole is fitted with three concentric pipes.

The hot water is forced down the outer space made by the concentric pipes. Hot air is forced down the center pipe. Air, water and the melted sulfur come to the surface in the space between the two inner pipes. The air bubbling through the mixture keeps the sulfur suspended.

The liquid mixture is then sprayed out evenly over vast, open air lots, where it is allowed to dry thoroughly before shipment. Such a sulfur pile is shown on the cover of this week's SCIENCE NEWS LETTER.

The melting point of sulfur is low but it is higher than that of ordinary boiling water—approximately 240 degrees Fahrenheit.



SULFUR WELL—These men are drilling a well for sulfur at the Newgulf, Texas, mine of the Texas Gulf Sulphur Company. If the element is found, superheated water will carry it to the surface where it is then dried out before shipping.

heit. For this reason superheated water with a temperature approaching 300 degrees Fahrenheit and under a pressure of about 100 pounds must be used.

Today's demand for sulfur and the increasing demands foreseen for the future are resulting in extensive activities to develop cheaper and more satisfactory ways of obtaining the important element from its plentiful ores and of recovering the sulfur from smelter gas, from the gases from petroleum refineries and from natural gas. An extended program is under way, sponsored by the U. S. Petroleum Administration for Defense.

Sulfur from Fool's Gold

Other programs are being carried out by the U. S. Bureau of Mines, research laboratories and private industries. One important project is under way by the Bureau of Mines in its laboratories at the University of Minnesota. Its objective is to find more practical means of obtaining both sulfur and iron from the iron sulfide deposits in that state. Minnesota has great deposits of this natural material, which is commonly known as pyrites and was once called fool's gold because of its appearance.

Petroleum refiners are heavy users of sulfur but great quantities can be recovered from the gases discharged into the atmosphere by the same refiners. These gases contain sulfur in vile smelling compounds that are not only obnoxious to smell but are also injurious to eyes and lungs. The recovery of the sulfur is an important step in the prevention of air pollution.

Many processes are used to recover the sulfur in refinery gases but what is called an improved method has recently been developed at the Polytechnic Institute of Brooklyn. It is a method in which the foul smelling waste is burned under specially controlled conditions to give ordinary water and sulfur. The sulfur so obtained, even if it actually comes from the vile smelling hydrogen sulfide gas, is of high purity and suitable for uses where sulfur from other sources requires expensive purification. Refinery gases in America could yield up to 500,000 tons annually to the supply, Institute chemists estimate.

While much sulfur is used in industrial production as sulfur itself or some of its important compounds, about three-fourths of America's total supply is converted into sulfuric acid. By far the largest role for this acid is in manufacturing superphosphate fertilizers, essential in growing crops to feed the American people. Fertilizer industries consume nearly 4,000,000 tons of sulfuric acid each year.

The second largest use of sulfuric acid is in the manufacture of other chemicals, including explosives needed in war, mining and other industrial activities. These purposes take some 2,000,000 tons.

Petroleum refining is the third largest consumer, using over 1,000,000 tons a year.

Without this sulfuric acid, essential steels for national defense and civilian applications would be produced with difficulty.

One hope for meeting the shortage of sulfur lies in using acids other than sulfuric to make superphosphate fertilizers. The job is being tackled seriously in both England and the United States, and progress is reported. The British Department of Scientific and Industrial Research has found that a mixture of sulfuric and nitric acids will work. The American Tennessee Valley Authority is exploring possibilities of a mixture of nitric acid with either sulfuric or phosphoric acid.

The British research shows that nitric acid alone can reduce the phosphate rock, giving the soluble calcium phosphate known as superphosphate and calcium nitrate as a by-product. With sulfuric acid, calcium sulfate is the by-product.

Calcium nitrate is a valuable fertilizer but it absorbs moisture readily, causing caking. Calcium sulfate does not. When a mixture of the two acids is used in a ratio approaching half and half, the sulfate formed seems to protect the nitrate from water absorption. The work of the American TVA bears out the British findings.

Nitric acid, unlike sulfuric, does not require a chemical element obtained from the crust of the earth. It can be made from the abundant supply of nitrogen in the atmosphere. By a so-called fixation process this atmospheric nitrogen is captured and converted into an oxide which, when chemically united with water, becomes nitric acid. England can make its own nitric acid and its fertilizer industry need no longer depend so largely on the availability of American sulfur.

U. S. Production Greatest

Of course, the United States is not the only nation mining native sulfur but it produces perhaps ten times as much as the rest of the world combined. Up to 1900, Sicily produced about 90% of the world's supply and America imported many thousands of tons of it each year. Some 45 years ago the production of Louisiana sulfur by the Frasch process made this country independent of imports. With the discovery of Texas sulfur domes a little later, America became a supplier to the rest of the world. Texas ranks first in American production.

Other countries producing sulfur in addition to Italy, which includes Sicily, are Japan, France, Chile, Bolivia and Peru. A dozen other nations produce some. Of course, sulfur is being produced in many parts of the world from pyrites and other sulfur-bearing minerals such as galena, zincblende and sulfates. But the cost is high. What is needed is the discovery of more natural deposits and cheaper methods of reducing sulfur ores. Substitutes for sulfuric acid would greatly extend the present available supply.

Science News Letter, November 10, 1951

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MEDICINE

Blood Pressure Readings Take Skill and Knowledge

► MEASURING BLOOD pressure takes more skill and knowledge than the average person realizes. The importance of accurate readings as a key to detection of abnormalities that may lead to heart and blood pressure disorders has been stressed by Dr. Carl J. Wiggers of Western Reserve University School of Medicine, Cleveland.

"We know that in many amusement parks and fairs one may obtain for a small fee not only a reading of the lines of one's hand or the bumps on one's head, but also of one's blood pressure. The operators in charge of such blood pressure machines probably give the subject a reading to the best of their ability, but it is highly questionable whether any of them have sufficient basic training to give correct readings," Dr. Wiggers warned.

"The patient whose blood pressure is being read is under the impression that the procedure consists simply of placing a cuff on the arm, inflating and deflating it, and that in some simple but unknown way his blood pressure is being measured. It is not generally realized that the measurement of blood pressure is not a mechanical affair, such as taking temperature and ascertaining weight. On the contrary, accurate readings depend fully as much on the technique, skill, and knowledge of the operator as on the accuracy of the instrument. Everyone will realize that it is not only important to get a reading of blood pressure, but that the reading be as accurate as possible."

To assist in assuring the validity and uniformity of blood pressure readings, the American Heart Association has published a new guide for physicians, titled, "Recommendations for Human Blood Pressure Determinations by Sphygmomanometer."

Science News Letter, November 10, 1951

BOTANY

NATURE RAMBLINGS



Ferns

► LATE AUTUMN is a good time to pay attention to the ferns. We are kept pretty busy on our woodland rambles in spring and summer, and even during early autumn, trying to hold ourselves abreast of the rapid procession of blossoming things.

However, when frosts have laid waste the petals and crippled the insects that make them worth producing, then we can turn our attention to the lesser but older relatives of the flowering plants, now consigned to back seats by the hustling later comers.

The patient ferns have for the most part waited for us, too. Ferns do not shed their leaves as broad-leaved trees and bushes do. While some of them, like the maiden-hair and the bladderwort, may have withered and curled beyond the possibility of examination, there are very many species that are true evergreens, holding up their tough, strong little leaf-blades dark green and alive even when buried deep in snow.

And there are others, like the royal fern and the spleen wort, that keep green in defiance of frost until really heavy cold weather strikes them, and then, though brown and dead, still hold their shapes well enough to be worth study.

Even when the vegetative leaves have all been struck down, there still remain those odd structures which many ferns produce—pre-Cretaceous analogues of flowers. "Fertile fronds," botanists call them; they bear clouds of spores that fly out like brown dust when you brush against them.

You will find these among the sensitive ferns and cinnamon ferns. Others, like the Christmas fern, fashion their fertile fronds like the non-sporulating sterile ones, except that on the backs of the leaflets—perhaps only the leaflets near the tip—we find the little brown dots where the spores are borne.

The ferns that we select for decoration are usually the sterile fronds, for the fertile ones are not so graceful, and many uninformed people think that the brown spore cases are a fungus.

The Christmas fern, being very firm in texture, is much used in holiday decoration, from whence comes its common name, much easier to remember than *Polystichum acrostichoides*, its real name. It grows best in well-shaded woodlands, preferring a spot near trees that shed their leaves rather than near evergreens. Indeed, full sunshine has been known to kill this plant.

Science News Letter, November 10, 1951

GEOLOGY

Fossil Earthquake Fault Discovered in California

► AN EARTHQUAKE fault similar to California's famous San Andreas fault—which destroyed San Francisco in 1906 and has shaken the state severely many times since—has been located in the Tehachapi mountains.

However, Californians or visitors to the West Coast need not lose any sleep over the discovery. It is what geologists call a fossil fault and has not been active for at least 2,000,000 years and maybe more.

It is named the San Gabriel fault and was located by Dr. John C. Crowell, assistant professor of geology at the University of California at Los Angeles, about seven miles south of U. S. Highway 99 near the little town of Gorman, about half way between Los Angeles and Bakersfield.

Apparently active during the Middle Miocene, Pliocene and part of the Pleistocene periods, 20,000,000 to 2,000,000 years ago, the San Gabriel fault is described by Dr. Crowell as showing a displacement some 20 miles from its original position. Like the San Andreas fault, the San Gabriel moved with a sideways motion.

Science News Letter, November 10, 1951

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Since late in 1940, packages like these have been going forward to members of the THINGS of science group. Glance over this list, then decide whether a membership which brings monthly packages on subjects as widely varied as these, isn't just the thing for that most unusual person on your Christmas Gift list.

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ASTRONOMY OF STELLAR ENERGY AND DECAY: A General Reader's Outline of Facts and Theories About the Life-History of Stars, and a Student's Introduction to Their Radiation, Steady or Varying or Catastrophic—Martin Johnson—Dover, 216 p., illus., \$3.50. Divided into two parts, one for the general reader, the other containing quantitative arguments.

THE BACULUM OF THE GORILLA—D. Dwight Davis—Chicago Natural History Museum, 3 p., illus., paper, 10 cents. A technical description of these bones as found in a lowland gorilla, "Bushman," and a wild mountain gorilla.

A BIBLIOGRAPHY ON "THE EFFECTS OF X-RAY ON BACTERIA"—Radcliffe F. Robinson, Michael D. Phillips, and Margaret G. Nagelsen—Battelle Memorial Institute, 17 p., paper, free upon request to the publisher, 505 King Ave., Columbus 1, Ohio. Containing 178 references from 1896 to the present year.

BIOLOGIA: An International Year-Book Devoted to the Pure and Applied Plant and Animal Sciences. Volume 2 (1950/51)—Frans Verdoorn, Ed.—Chronica Botanica, 221 p., illus., paper, \$4.75. Devoted to the social science aspects of plant science. Originally intended to be published as a periodical but now become a year-book.

THE COOKIE JAR—Josephine Perry—Barrows, 7th Printing, 157 p., \$2.50. This recipe book of goodies from other lands, as well as the local variety, should contribute pleasantly to international understanding.

EARLY AMERICAN DECORATING PATTERNS—Peg Hall—Barrows, 150 p., illus., \$5.95. A guide for collectors, generously illustrated, partly in color.

EQUIVALENT CIRCUITS OF ELECTRIC MACHINERY—Gabriel Kron—Wiley, 278 p., illus., \$10.00. For use of engineers in solving practical problems. The only prerequisite, the author says, besides some familiarity with elementary theory of machines, is "an earnest desire to learn."

HUMAN RELATIONS IN HIGHER EDUCATION: A Report of a National Student Conference held at Earlham College, March 29-31, 1951—Francis J. Brown and Richard B. Anliot, Eds.—American Council on Education, 74 p., p., paper, \$1.00. Report of a conference on

how to encourage the equalization of opportunities for higher education.

MATHEMATICS OF INVESTMENT—Paul R. Rider and Carl H. Fischer—Rinehart, 359 p., \$5.00. For those lucky enough to have spare sums of money available. Includes tables of compound interest, mortality, and logarithms.

NAVAHO MEANS PEOPLE—photographs by Leonard McCombe, text by Evon Z. Vogt and Clyde Kluckhohn—Harvard University Press, 159 p., illus., \$5.00. A beautiful photographic portrayal of the daily life and rituals of this tribe.

NEW CONCEPTS OF HYPNOSIS: As an Adjunct to Psychotherapy and Medicine—Bernard C. Gindes—The Julian Press, 262 p., \$4.00. Includes a history of hypnosis, the author's theory explaining it, and recommendations for hypnotic therapy.

ON BEING INTELLIGENT—Ashley Montagu—Henry Schuman, 236 p., \$2.95. A distinguished authority tells you how you may order your life better and achieve a greater measure of fulfillment.

POTTERY AND PORCELAIN: A Guide to Collectors—Frederick Litchfield—Barrows, 5th ed., 356 p., illus., \$12.50. An entirely revised edition of this beautiful standard work. Information about ceramics from the earliest known times to the 19th century for collectors and students. Many illustrations in color.

QUANTUM THEORY OF MATTER—John C. Slater—McGraw-Hill, 528 p., illus., \$7.50. Includes many problems intended to encourage the student to think through the matter so as to understand the principles involved.

RECREATION AND PARK YEARBOOK, MIDCENTURY EDITION: A Review of Local and County Recreation and Park Developments 1900-1950—National Recreation Association, 69 p., paper, \$1.50. Statistics of recreation facilities available and their use. Most popular is swimming.

SELECTION OF HEARING AIDS—Edith L. R. Corliss—Govt. Printing Office, National Bureau of Standards Circular 516, 17 p., illus., paper, 15 cents. Explaining points to look for so as to select that particular hearing aid best suited to the individual's needs.

STAMPS: A Handbook for Collectors—Wilfrid Dellquest—Barrows, 187 p., illus., \$2.00. A reference book to help the collector understand his hobby.

THE TELEVISION PROGRAM: Its Writing, Direction, and Production—Edward Stasheff and Rudy Bretz—A. A. Wyn, 355 p., illus., \$4.95. Many television programs, it is pointed out, are really transmitted shows which might be presented in other media, just as the first automobiles were buggies with motors. It remains for television to develop its own techniques.

TRADE BARRIERS TO KNOWLEDGE: A Manual of Regulations Affecting Educational, Scientific and Cultural Materials—UNESCO (Columbia University Press), 167 p., paper, \$1.00. Data on the restrictions placed by various countries on the import and export of cultural

material. Attempts are being made by UNESCO to get the nations concerned to remove such barriers to the exchange of knowledge.

YOUNG GERMANY: Apprentice to Democracy—Department of State—Govt. Printing Office, State publication 4251, 78 p., illus., paper, 35 cents. The young of the Federal German Republic are "a reassuring as well as an engaging sight," but they have many urgent needs and problems.

Science News Letter, November 10, 1951

GEOLOGY

Beryl Discovered in Clay Deposits Near Delhi

► **DEPOSITS** OF the semi-precious stone beryl, ore of beryllium metal useful in atomic energy work, were discovered in recent months near Delhi City by K. L. Bhola, mining geologist of India's Atomic Energy Commission.

Workable but of small extent, the deposits are contained in decomposed feldspar that for some decades has been quarried for pottery clays and kaolin for ceramics factories. Considerable quantities of beryl may have been lost in past years through lack of realization of its identity and value.

Science News Letter, November 10, 1951

ENTOMOLOGY

"Praying" Mantis Takes Attitude to Prey and Fight

► **THE "PRAYING"** mantis (or mantid) is preying not prayerful. For its size it is one of the most predatory animals in existence, Dr. Ashley B. Gurney, entomologist of the U. S. Department of Agriculture, states in the annual report of the Smithsonian Institution.

The prayerlike pose of this near relative of the cockroach is its normal position both for seizing prey and for defending itself. Front legs of the mantis bear sharp spines and fold somewhat as if they were hinged, thus enabling the insect to reach forward, seize its prey and bring it to its mouth. The mantis feeds entirely on other animals, chiefly insects caught alive.

They have enormous appetites—an adult mantis has been known to eat ten cockroaches in less than three hours, Dr. Gurney states. Although there are more than 1,500 species of mantids in the world, most of them are found in the tropics, he says, only 19 being known in the United States.

Mantids have developed considerable camouflage. They appear to resemble flowers, other insects and large ants, assuming colors that vary from white or pale pink to brilliant blue in order to blend into the background.

For the most part, Dr. Gurney points out, mantids are beneficial insects, because their prey is mostly other insects injurious to gardens. They are not poisonous.

Science News Letter, November 10, 1951

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SURGERY

Make Short Leg Grow

► AN ELECTRIC battery method of stimulating bone growth which made a child's short leg grow over half an inch in six months, compared to about two-tenths of an inch growth for the normal leg in that time, was reported at the meeting of the American College of Surgeons in San Francisco.

The method was developed by Dr. C. Laird Wilson of McGill University and the Children's Memorial Hospital, Montreal, Canada.

Dr. Wilson calls it an electrolytic method, but essentially it is a set-up like an electric battery in which a voltaic current is produced between two dissimilar metals. Twisted strands of constantan and copper are inserted into the shaft of the shin bone close to each end of the growing bone. An electrolytic reaction starts between the two kinds of metal and this stimulates growth of the bone.

Puppies and two children on whom this operation has been performed did not have any pain and were running around normally the day after operation. They did not limp and "paid no more attention to the leg containing the wires than to the control leg," Dr. Wilson reported.

Whether the wires will have to be reinserted after they have grown away from the ends of the growing bones is yet to be determined. The stimulating effect may be lost as the distance from the battery to the ends of the bones increases. The ends of the wires must be in intimate contact with each other with a prolonged "battery effect" to be operative, Dr. Wilson said.

The children on whom the method has been started were born each with one short leg. The effects are good but not yet constant. Dr. Wilson stated. The inconsistency is the next problem he plans to work on.

Idea for the battery method of stimulating leg growth came in part from the observation that an electrolytic reaction occurred when dissimilar metals were used in plating broken bones. Part of it came from the fact that a leg often gets longer in a child who has had a break in the middle of the thigh bone and in a child with osteomyelitis when the bone damage is close to the epiphyseal plate at the end of the bone.

Science News Letter, November 10, 1951

INVENTION

Radio Programs Listened to Recorded by Home Receivers

► TROUBLESOME TELEPHONE calls to radio users asking the name of radio or television station being listened to may be eliminated with an improved device to make automatic records on which a patent has been issued.

Inventor is Serge A. Scherbatskoy, Tulsa, Okla. His award was patent 2,573,279. Its use would require broadcasting stations to send out at intervals identification signals. Collaborator receivers would be equipped with means to record the signals.

Science News Letter, November 10, 1951

AGRICULTURE

Test for Soil Needs

► GROWING SEEDS that are particularly sensitive to the richness of the soil is a good way to find out whether your garden needs fertilizer.

Clover, alfalfa or rye are good to use in testing your soil. Or you can use the seed from your breakfast grapefruit or orange, or from a lemon the next time you have a lemon drink.

A dozen or more small containers such as six-ounce tumblers, jelly glasses or waxed paper cups can be used as "pots" for the test. A dime or nickel makes a good measuring scoop for the fertilizer.

All except one pot should be given a fertilizer treatment. This is kept unfertilized so you can compare the growth in your original soil with that in the treated pots. As most soils are overly acid half of the pots should have dolomite sand or

hydrated (builders') lime added to their soil to overcome this defect if it exists.

The individual fertilizers you try should each be added to the soil in two pots, one containing the typical soil from your lawn or garden and one with the anti-acid treatment. Each pot should be carefully marked as to the fertilizer treatment it has received.

Plant the seeds in sets of three, about five little mounds in each pot. How well the plants are flourishing at the end of a month or so will be a pretty good indication of your soil needs.

Citrus, especially grapefruit, are among the most exacting crops in their plant food requirements and frequently show major differences in growth from only small differences in available plant food.

Clover or alfalfa usually makes poor growth on soils that are not well supplied with calcium, phosphorus and potassium. Rye is also a good test crop as it grows rapidly and draws heavily on the fertility of the soil during the early stages of growth.

A kit containing little packets of the six different types of fertilizer most frequently used today, limestone to overcome soil acidity, limus paper to test for acidity and clover seed to grow in the fertilized pots, has been prepared for you by SCIENCE SERVICE. Complete with full directions for preparing the soil and growing the clover and citrus seed, it is available for the nominal price of 75 cents. Just write SCIENCE SERVICE, 1719 N St., N. W., Washington 6, D. C., and ask for the Fertilizer Unit.

Science News Letter, November 10, 1951

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✿ **BABY CUP**, designed to prevent spilling and upsetting, has a weighted bottom which automatically uprights the plastic cup if it is pushed over. It has a detachable top to control the flow of contents and a full-length handle to provide a firm grip for a small hand.

✿ **ILLUMINOMETER**, a weather instrument to record the intensity of daylight, has a photocell unit and a recorder that can be placed several hundred feet apart without loss of sensitivity. The cell assembly is designed for mounting on top of a mast; the housing casts no shadows on the receiving surface.

✿ **VINSOL RESIN** solution, for use in the concrete mixer to entrain air in the product, results in a concrete filled with minute air bubbles that is highly resistant to weathering, abrasion and frost. Concrete roads with the entrained air bubbles resist the scaling caused by de-icing salts.

✿ **NECK PILLOW**, shaped like a horse-shoe, is an inflatable device to fit snugly around the neck as shown in the photograph. Designed to provide sleeping comfort for people who like to take a nap



sitting up, it is of plastic and can be carried deflated in the hand bag.

✿ **RECTIFIER TUBE**, designed to meet military requirements under extreme tem-

perature changes, is filled with xenon gas that gives it high efficiency at temperatures between approximately 100 degrees below zero Fahrenheit and 200 degrees above.

✿ **SHOE-POLISHER**, with a small brush to spread the paste at one end and a woolly face to give the shine, has a hollow back within which a tube of paste is placed. A turn of a knob at one end forces a little paste out of the tube and on to the brush.

✿ **DUPLICATING MACHINE** makes exact copies of letters and other papers by a dry-process method utilizing infra-red light. An infra-red light source sends rays through a special heat-sensitive sheet to the black-and-white original copy. The black type face converts the rays into heat which acts upon the heat-sensitive sheet.

✿ **ALUMINUM ALLOY**, developed by the Air Force to withstand elevated temperatures, can be used in aircraft parts operating in temperatures up to 600 degrees Fahrenheit, twice as high as the present limit. It contains copper, nickel, magnesium, manganese, chromium, vanadium and titanium.

Science News Letter, November 10, 1951

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